Occasional Papers On Mollusks

Published by
THE DEPARTMENT OF MOLLUSKS
Museum of Comparative Zoology, Harvard University
Cambridge, Massachusetts

VOLUME 4 OCTOBER 17, 1984 NUMBER 65

NOTES ON *ACUTITECTONICA* (ARCHITECTONICIDAE) WITH A DESCRIPTION OF A NEW SPECIES, *A. SINDERMANNI,* FROM BRAZIL

ARTHUR S. MERRILL AND KENNETH J. BOSS

ABSTRACT. *Acutitectonica* is reinstated as the proper generic name for a group of architectonicids characterized by more or less depressed conical shells with a sharply angled body whorl and with weak to moderate sculpture; the radular formula is 2-1-2 with a knob-like central tooth. *Discotectonica,* which has been considered a senior synonym by some authors, is shown by a careful analysis of the figure of the type species not to be congeneric. A new species is also described.

Introduction

Habe (1961: 30) introduced the generic name *Acutitectonica*[1] for the species *Solarium acutissimum* Sowerby 1914 from off the southeastern coasts of Shikoko and Honshu Islands, Japan. Later that year Garrard (1961: 23) established the new genus *Russetia* on his new species *R. dilaniatus,* from off New Castle, New South Wales, Australia. Subsequently, Robertson [*in*] Marche-Marchad (1969: 486) considered *Discotectonica* Marwick 1931 as a senior synonym of *Acutitectonica* and placed the species *Architectonica placentalis* (Hinds 1844) and *Philippia discus* (Philippi 1844) in it; later Roberson [*in*] Keen (1971: 389)

[1]As best we can determine, Habe's name has priority; the Introduction of Habe (1961) is dated 20 April 1961—there is no specific dating for Garrard (1961); Habe's paper was received at the MCZ Library on 16 February 1962 and Garrard's 14 May 1962; Garrard (1968) indicated the junior synonymic position of *Russetia.*

mentioned *A. placentalis* and added *A. peracuta* (Dall 1899). Garrard (1978: 517) also advocated this procedure and additionally synonymized his own *Russetia* under *Discotectonica*. In this paper we critically evaluate the type species of *Discotectonica* and give our reasons why *Discotectonica* cannot be construed as being synonymous with *Acutitectonica*. We also describe and illustrate a new species of *Acutitectonica*.

Systematics

Family Architectonicidae Gray 1850
Subfamily Philippiinae Boss 1982

Genus Acutitectonica Habe 1961

Acutitectonica Habe 1961. Coloured Illustrations of the Shells of Japan, p. 30, pl. 13, fig. 21 (type species, *Solarium acutissimum* Sowerby 1914, original designation and monotype; Kii, Japan).

Russetia Garrard 1961. Journal of the Malacological Society of Australia, *5:* 23, pl. 1, figs. 11a, b (type species, *Russetia dilaniatus* Garrard 1961 [= *Solarium acutissimum* Sowerby 1914], original designation and monotype; Recent, trawled in 160 fathoms east of New Castle [New South Wales, Australia]).

Description. Shell moderately large, more or less depressed conical; protoconch usually small, with or without anal keel; body whorls sharply angled at the periphery; spiral and basal cords weakly to moderately strong and beaded; lip simple; aperture triangulate with basal outer margin subsinuate; siphonal canal strong; umbilical wall narrow, strongly axially marked; radular teeth five per row with central tooth knob-shaped or pointed and without lateral cusps in species examined. In addition, two species (*Acutitectonica acutissima* and *A. disca*) show a remarkable internal structure found in the esophageal region of the gut (see Boss and Merrill, 1984, for details); this structure has sometimes been mistaken for the radula (Habe, 1952; Melone, 1975). Operculum corneous, paucispiral with an offcenter nucleus and internal spiraled process.

Remarks. The genus *Acutitectonica* has living representatives in the tropical and subtropical deeper waters of the world, ranging from 25 to 230 fathoms, including such Indo-Pacific species as the type, *A. acutissima* (Pl. 44, figs. 1–3) from off southern Queensland and New South Wales, Australia through the Philippine Islands and to Japan, and *A. kuroharai* (Kuroda and Habe 1961) from off southern Queensland and Japan (Garrard, 1978). The genus is represented in the eastern Pacific by *A. disca* (Philippi 1844)[1] which is also present on both sides of the Atlantic, in the eastern Atlantic and the Mediterranean by *A. lepida* (Bayer 1942)[2] and *A. bannocki* (Melone and Taviani 1980) [Recent?] only lately discovered in the Mediterranean. A new species described herein is presently known only from the type locality in the western Atlantic.

Acutitectonica, along with the genus *Philippia,* has been placed in the subfamily Philippiinae because of its radular characteristics (Boss and Merrill, 1984).

Marwick (1931) proposed a new subgenus *Discotectonica* with *Architectonica balcombensis* Finlay 1927, a replacement name for *Solarium acutum* Tenison-Woods 1879, *non* Conrad 1854,[3] as the type species; the type locality is "Tertiary beds on the banks of the Muddy Creek, a tributary of the Wannon River, about five miles from Hamilton in Western Victoria", an Eocene Australian outcrop according

---

[1]We consider the following nomina to be synonyms of *A. disca:* the variant spellings *discum* and *discoideum, Solarium placentale* Hinds 1844 and its variant spellings *placentula* and *placentulum, S. pseudo-perspectivum* 'Brocchi' Jeffreys 1880, *non* Brocchi 1814, *S. perspectiviforme* Tiberi 1872 and *S. peracutum* Dall 1889.

[2]We include the following as synonyms: *Solarium pseudoperspectivum* 'Brocchi" Hanley 1863, *non* Brocchi 1814, *S. pulchellum* Tiberi 1868, *non* Michelotti 1841, *nec* d'Orbigny 1842 and *S. mediterraneum* Monterosato 1872, *non* Philippi 1853.

[3]Not 1860 as quoted by Finlay (1927) and others. Conrad introduced *Architectonica acuta* in 1854 *in* Walies, p. 289, Pl. 17, figs. 1a, 1b; a lectotype was designated by Palmer *in* Harris and Palmer, 1947, pp. 275 276 as listed in Moore (1962); the *nomen* was not listed in Ruhoff (1980).

to Harris (1897). Wenz (1939) utilized *Discotectonica* as a subgenus for *Architectonica* for New Zealand and Australian species of Eocene to Oligocene age. Subsequently the age of the type species has been redated to the Tertiary Balcombian Geological Horizon, or more specifically the Middle Miocene (Chapple, 1941; Garrard, 1978).

We herein reproduce Tenison-Woods' (1879) original description, comments, and illustration (Text fig. 1A and B) of the type species for *Discotectonica* as a basis for comparison with *Acutitectonica.*

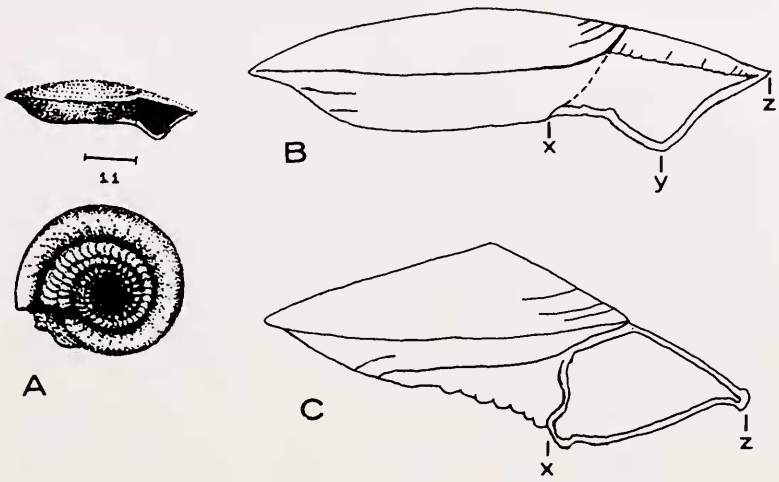
SOLARIUM ACUTUM. Pl. 21, fig. 11.

S. t. parva, depressa, discoidea, tenui, nitente; anfrac, 4, omnino planatis, liratis, ad margines duobus liris majoribus granulosis insignitis; ad peripheriam acutis; basi in medio conspicue convexa, tenuiter lirata; umbilico costulis et liris granulosis in lineis 4 vel 5 marginata. Apertura transversim ovata. Alt. 1½, diam. 6.

This fossil is not very common. It is easily distinguished by its very small size and depressed form and very acute periphery, where the edge of the shell is produced into a sharp projecting keel. The upper surface is distinctly lirate, and the edges of each whorl margined with rather broad granular lines, two or three in number, the central one where there are three, being much smaller. The under side is abruptly convex in the middle, and faintly lirate. The umbilicus is broadly margined with three to five spiral lines of granules or riblets, varying in size and forming a very elegant pattern. In the figure of this shell on Plate 21, the side view and base with the umbilicus are represented. The species is not like any existing or fossil, its nearest representative is *S. millegranum,* Lamarck. Prof. Tate informs me that this species reaches nine-tenths of an inch in diameter, and that then the ornament is slightly different.

Tenison-Woods (1879) stresses the very small size (6 mm) and a greatly depressed form as easily distinguishing characters. Its aperture clearly portrayed in the type figure (Text plate 1A, B), is distinctly different from true *Acutitectonica* in lacking or possessing a very reduced columellar margin which forms the umbilical wall and the strong siphonal canal of *Acutitectonica.* The "abruptly convex" base of *S. acutum* is reflected in the angulation x-y-z of the apertural view of Text fig. 1B and the basal view of Text fig. 1A which is unlike the more or less flattened to weakly convex base of the typical *Acutitectonica* (Text fig. C, x, z).

Further, the body whorl appears to wrap more completely preceding whorls, a condition reminiscent of the heliacene genera *Awarua,* or *Pseudomalaxis* of the Architectonicidae. The umbilicus, though stated to be margined by 3–5 cords appears to have two exceptionally strong ones inthe basal view of the type figure (Text fig. 1A). These strong umbilical and periumbilical cords are in the area x-y of the apertural view in Text fig. 1B.



Text figure 1

A. *Solarium acutum* Tenison-Woods 1879, *non* Conrad 1854 [Type figure]. Middle Miocene, "... on the banks of the Muddy Creek, a tributary of the Wannon River, about five miles from Hamilton in Western Victoria."; apertural and basal views; maximum diameter 6 mm; height 1.5 mm (after Tenison-Woods 1879: Pl. 21, fig. 11).

B. Line drawing of *S. acutum* Tenison-Woods after the type figure; enlarged about ten times to show structure of the aperture which appears to be more heliacine than philippine.

C. Line drawing of a small specimen of *Acutitectonica lepida* (Bayer 1941) from Ras el Amoush, Mediterranean Sea; actual size 9 mm; enlarged about 7 times to show structure of the aperture of a typical *Acutitectonica.*

The mistaken interpretation of *Discotectonica* as *Acutitectonica* is probably based on the figures of "*S. acutum* Tenison-Woods" provided by Harris (1897: 244, Pl. 7, figs. 6a-c) and reproduced by Wenz (1939: 671, fig. 1913). That specimen is about 19 mm in diameter (3 times larger than the original of Tenison-Woods)—Harris' fig. 6c shows an enlargement of a pie-shaped section of the base, indicating the rather strong numerous (7) periumbilical sulci and granulations. Although Harris does not provide an apertural view there is every indication that it is an *Acutitectonica* as seen in the flattened or weakly convex base, sharp peripheral edge, and the umbilical wall.

Further confounding the issue, Garrard (1978: 520), who noted that the holotype of *S. acutum* Tenison-Woods 1879 was lost, designated a neotype for it. We do not concur with Garrard's selection since the specimen he designated does not agree with the original description, explanatory notes, and figure of Tenison-Woods (1879).[1] Tenison-Woods stressed the small size of his *S. acutum,* namely, 6 mm in diameter and 1.5 mm in height; the specimen designated neotype is 17.5 mm or nearly 3 times larger and its height is 7.0 mm or more than 4 times greater than *S. acutum.* Not only is this neotype larger in size but its proportions differ from that of the holotype; the height/diameter ratio for the holotype (1.5/6) is 0.25 while for the neotype (4/17.5) it is 0.4. Clearly the holotype was, as Tenison-Woods described and illustrated it, depressed, certainly more so than in the neotype. Actually, Tenison-Woods' type figure was even more depressed than his illustration of the apertural view shows since the figure was not aligned to show the exact outline of the aperture as indicated by the exposed dorsal surface of the body whorl above the upper margin of the aperture.

Garrard (1978) also stated: "No other Australian Tertiary fossil species in the genus *Architectonica* possesses the acute

[1]Therefore, the specimens described and figured by Garrard for what he considered to be "*Solarim acutum* Tenison-Woods" and its replacement name "*Architectonica* (*Discotectonica*) *balcombensis* Finlay" represent an unnamed species of *Acutitectonica.*

peripheral keel and concave basal area adjoining...." which indicates that his specimens were representatives of a species of *Acutitectonica* (Garrard 1978, Pl. 6, figs. 6–8; Pl. 10, figs. 7–9); for the true *S. acutum,* Tenison-Woods (1879) stressed that the base was abruptly convex as clearly shown in Text fig. 1A and B. It is true that *S. acutum* has a depressed form and acute peripheral keel as expressed in Tenison-Woods' type figure (Text fig. 1A and B). However, it must be emphasized that the species is dorsally depressed to the peripheral keel and lacks the even dorsal and basal symmetry of a typical *Acutitectonica* (Text fig. 1C).

Acutitectonica sindermanni new species

Plate 45, figures 1–3

Plate 46, figures 1–2

Description. Shell size medium-small, 8.9 mm in maximum diameter, 4.4 mm in height. Shell strong, color whitish (dead shell); spire depressed-conic; carina sharply keeled; umbilicus moderately open; whorls 3 1/3—defined by a strong dorsal penultimate cord and an even stronger peripheral cord. Protoconch anastrophic, very large (1.33 mm), inflated, emerging and inverting in a single whorl, with an anal keel. Sculpture on dorsum consists of five moderately developed spiral cords and a relatively strong peripheral cord. The first, third, and fourth cords moderately weak, second and fifth comparably stronger; no spiral threads interspersed with cords; sutures well defined. Spiral cords crossed by rather light axial plicae to produce weakly nodulated cords. Basal spiral sculpture consists of a strong nodulated umbilical cord, a moderately strong spiral cord adjoining the peripheral cord, and additional very faint spiral cords and threads on body. Axial plicae radiate above the umbilical cord towards the periphery gradually weakening and disappearing about midway to the periphery; a distinct suture separates the umbilical cord and the axial plicae; a wide, shallow excavation divides the penultimate and peripheral cords. Umbilical wall recessed, rather smooth—marked by very fine axial striae and occasionally by craggy growth plications; aperture subquadrate, sharply keeled at the periphery, lip thin and simple, siphonal canal grooved. Radula and operculum unknown.

Holotype. Museum of Comparative Zoology, No. 294313. Height 4.4 mm; maximum diameter 8.9 mm.

Type locality. About 105 miles north of Cabo Orange, Brazil (06°05′N. Lat.; 51°21′W. Long.), in 96 meters.

Remarks. Acutitectonica sindermanni is known from a single adult specimen. The species is distinct and has characters that easily separate it from *A. disca, A. bannocki,* and *A. lepida,* the other Atlantic forms. The protoconch is almost twice as large as in *A. disca* (1.32 to 0.72 mm) and possesses an anal keel. Other characters separating it from *A. disca* are dorsally the stronger delineated spiral cords in *A. sindermanni* which number six, including the peripheral cord; three are rather uniform with no spiral threads between them. The weakly developed dorsal spiral cords and threads in *A. disca* number about eight. In *A. disca* the basal cords are also generally more weakly developed except for two strong spiral cords adjoining the umbilical cord—the area of strong axial sculpture in *A. sindermanni.* The dorsal surface is more strongly developed in *A. bannocki* with a combination of axial and spiral dominance—the axial sculpture of the inner part of the whorl is actually contoured and separates it clearly from the outer flatter spiral sculpture. Dorsal spiral sculpture is lacking in *A. lepida* except for penultimate and peripheral cords.

Acknowledgments

This species is named for Dr. Carl J. Sindermann, Northeast Fisheries Center, Sandy Hook Laboratory, New Jersey, friend and erstwhile colleague of the senior author. We thank Mr. Richard I. Johnson and Dr. Ruth D. Turner for critical review of the manuscript.

Literature Cited

Boss, K. J. and A. S. Merrill. 1984. Radular configuration and the taxonomic hierarchy in the Architectonicidae (Gastropoda). Occasional Papers on Mollusks, Museum of Comparative Zoology, Harvard University, *4*(66): 349–411.

Chapple, E. H. 1941. New species of Tertiary Mollusca from Victoria. Memoirs of the National Museum of Victoria, *12*: 119–124.

CONRAD, T. A. 1854. Fossil Testacea of the Tertiary green-sand marl-bed of Jackson, Mississippi, *in* B. L. C. Walies. Report on the Agriculture and Geology of Mississippi. Jackson, Miss., p. 289.

FINLAY, H. J. 1927. New specific names for Australian Mollusca. Transactions and Proceedings of the New Zealand Institute, *57*: 488–533.

GARRARD, T. A. 1961. Mollusca collected by M. V. "Challenge" off the east coast of Australia. Journal of the Malacological Society of Australia, *5*: 2–37.

_____. 1978. A revision of Australian Architectonicidae (Gastropoda: Mollusca). Record of the Australian Museum, *31*(13): 506–584.

HABE, T. 1952. Pholadomyidae, Clavagellidae, Pandoridae, Juliidae and Condylocardiidae in Japan. *In* T. Kuroda, ed., Illustrated Catalogue of Japanese Shells, no. 18, pp. 121–132.

_____. 1961. Coloured Illustrations of the Shells of Japan. Osaka, 183 pp.

HARRIS, G. D. AND K. V. W. PALMER. 1947. The Mollusca of the Jackson Eocene of the Mississippi Embayment (Sabine River to Alabama River), pt. 2 Univalves. Bulletin of American Paleontology, *30*(117), pt. 2: 207–563.

HARRIS, G. F. 1897. Catalogue of Tertiary Mollusca in the Department of Geology, British Museum (Natural History). pt. 1. The Australian Tertiary Mollusca. London, 407 pp.

KEEN, A. M. 1971. Sea Shells of Tropical West America. Stanford University Press, 1064 pp. (2nd ed.).

MARCHE-MARCHAD, I. 1969. Les Architectonicidae [Gastropodes Prosobranches] de la côte occidental d'Afrique. Bulletin de l'Institut Fondamental d'Afrique Noire, *31*(2), Série A: 461–486.

MARWICK, J. 1931. The Tertiary Mollusca of the Gisborne District. Palaeontological Bulletin. New Zealand Geological Survey. Wellington, *13*: 1–177.

MELONE, G. 1975. Considerazioni sistematiche su un architectonicide giapponese: *Acutitectonica acutissima* (G. B. Sowerby, 1914) (Gastropoda, Prosobranchia). Conchiglie, *11*(7–8): 165–174.

MOORE, E. J. 1962. Conrad's Cenozoic fossil marine mollusk type specimens at the Academy of Natural Sciences of Philadelphia. Proceedings of the Academy of Natural Sciences of Philadelphia, *114*(2): 23–120.

RUHOFF, FLORENCE A. 1980. Index to the species of Mollusca introduced from 1850 to 1870. Smithsonian Contributions to Zoology, no. 294, 640 pp.

TENISON-WOODS, I. E. 1879. On some Tertiary fossils from Muddy Creek, Western Victoria. Proceedings of the Linnean Society of New South Wales, *3*: 222–240.

WENZ, W. 1939. Gastropoda. Prosobranchia. *In* O. H. Schindewolf, ed. Handbuch der Paläozoologie. Berlin, *6*(3): 481–720.

Plate 44

Fig. 1. *Acutitectonica acutissima* (Sowerby 1914). Japan. MCZ 294338; maximum diameter 37.6 mm, height 14.5 mm; dorsal view.

Fig. 2. The same; apertural view.

Fig. 3. The same; basal view.

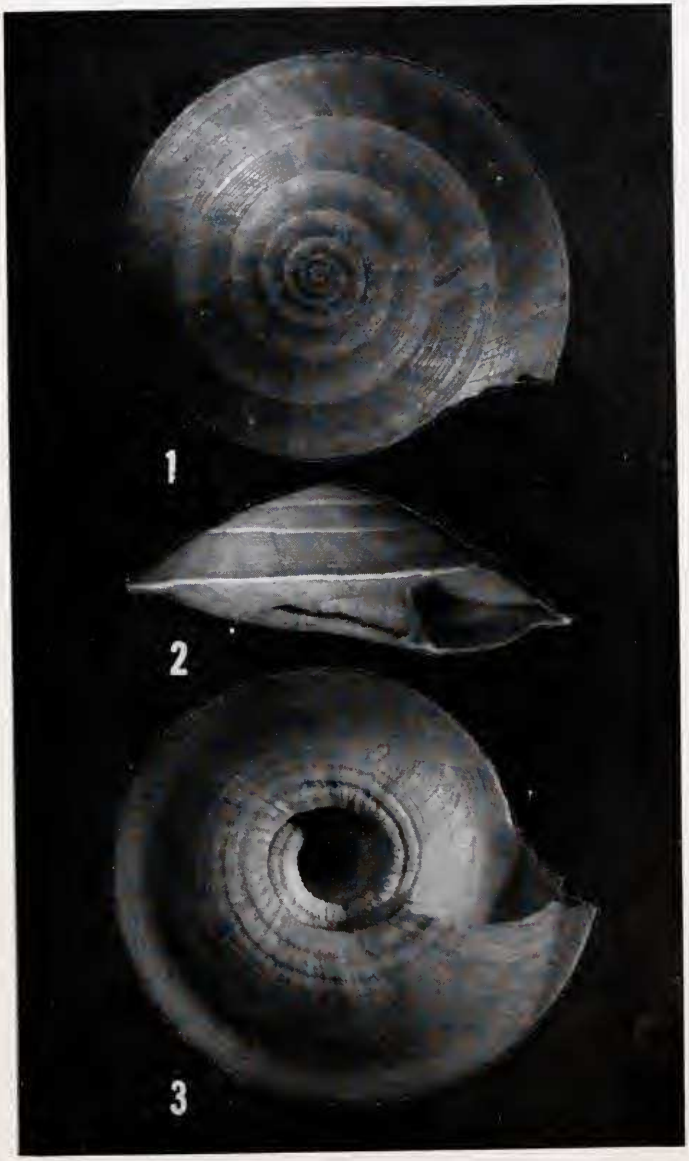


Plate 44

Plate 45

Fig. 1. *Acutitectonica sindermanni*, new species. 105 miles north of Cabo Orange (06°05′N. Lat.; 51°21′W. Long.), Brazil in 96 meters. Holotype MCZ 294313; maximum diameter 8.9 mm, height 4.4 mm; dorsal view.

Fig. 2. The same; apertural view.

Fig. 3. The same; basal view.

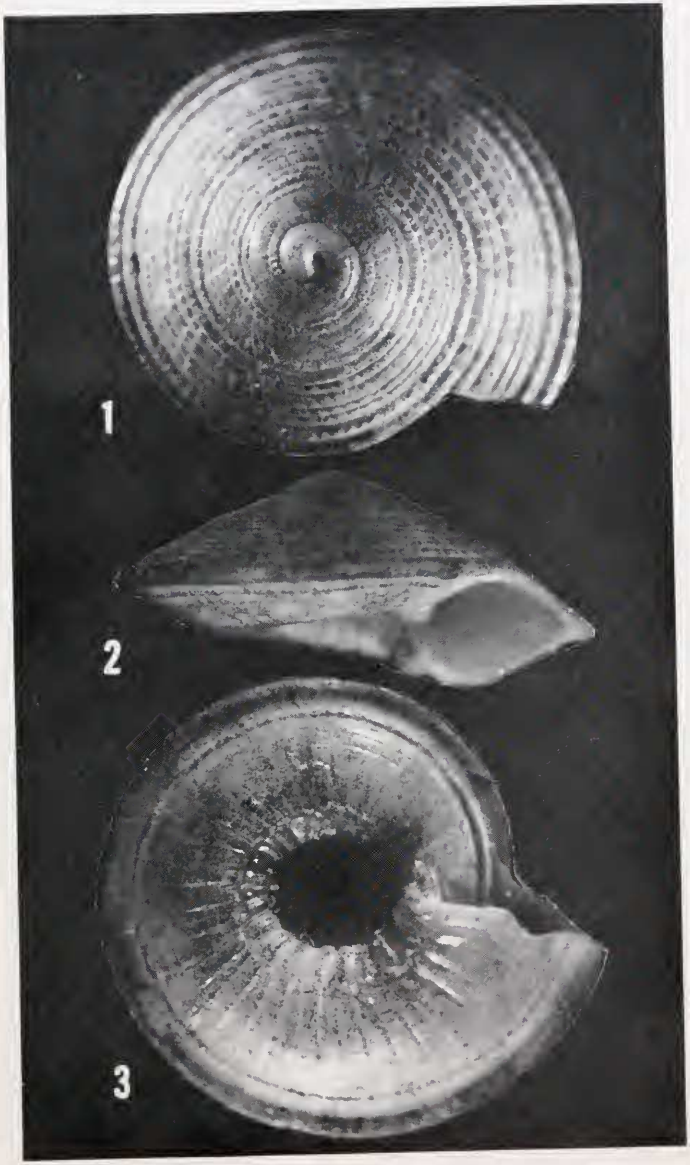


Plate 45

Plate 46

Fig. 1. *Acutitectonica sindermanni*, new species, holotype temporarily coated with magnesium to highlight the configuration of the dorsal spiral sculpture (×8.5).

Fig. 2. Same specimen enlarged to show detail of the very large anastrophic protoconch. Maximum diameter of the protoconch, 1.33 mm (×19).

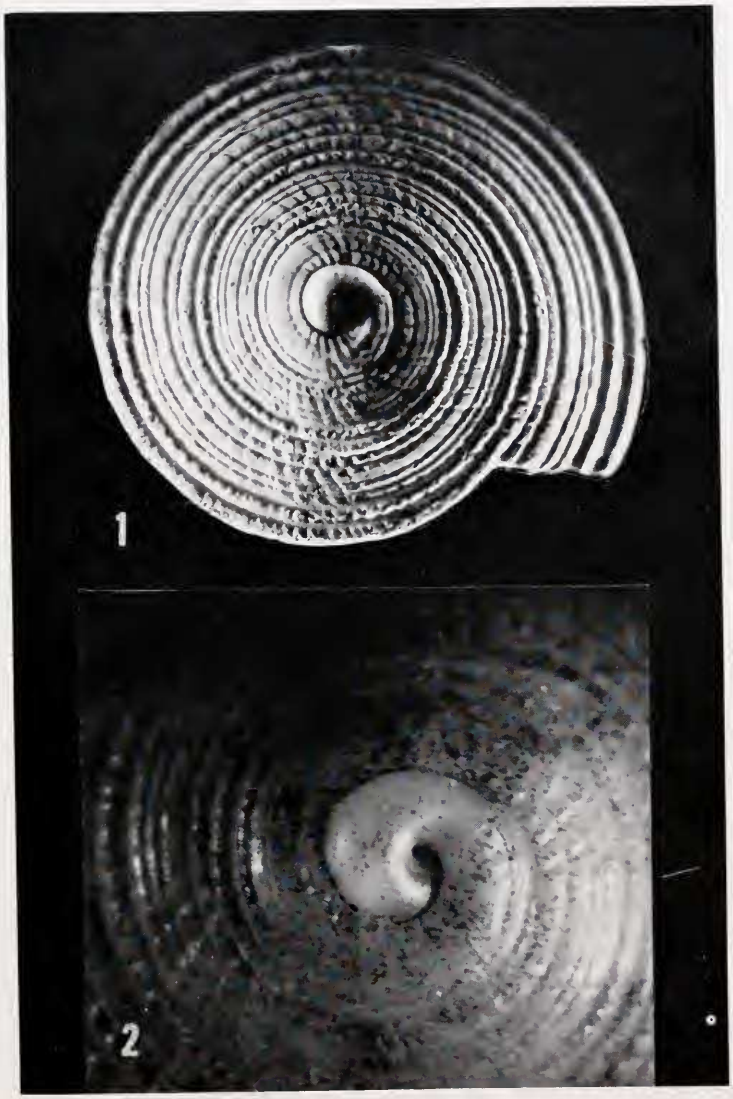


Plate 46